

**A Biogeographic Approach to Determining Potential World Heritage Sites in
“Tropical Coastal, Marine and Small Island Ecosystems”**

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Background Paper for the September 17-21st Workshop to be held in Manila, Philippines:
**World Heritage Biodiversity: Filling Critical Gaps and Promoting Multi-Site
Approaches to New Nominations of Tropical Coastal, Marine and Small Island
Ecosystems**

Introduction:

Background Context:

While the oceans comprise 70% of the earth's surface, less than 1% of the marine environment is within protected areas, compared with nearly 9% of the land surface. Moreover, over half of the global population resides within 60 km of the shoreline, placing increasing stresses on coastal and marine resources and the areas upon which they depend. (WCPA – Marine). In terms of the number of phyla, the marine realm is much richer than the terrestrial; Marine ecosystems contain representatives of some 43 phyla while terrestrial environments contain only 28 phyla. (World Resources Institute). Yet, the biodiversity of the marine realm is still being discovered and described; there are estimates of millions of species that have not been catalogued, and new species are discovered every year.

The Convention Concerning the Protection of World Cultural and Natural Heritage, or the World Heritage Convention (UNESCO, 1972) is an important tool for conserving areas of global biodiversity significance. However, of the 690 cultural and natural sites included in UNESCO's World Heritage List, only 65-70 sites are recognized for their biodiversity value, and an even smaller subset, (less than 10 sites) are recognized entirely for their marine biodiversity value. There are 33 tropical World Heritage Sites with marine components; however, the majority of sites are managed for their terrestrial biodiversity or migratory bird populations, rather than their marine biodiversity. In an effort to increase the World Heritage coverage of underrepresented ecosystems, including “tropical coastal, marine and small island ecosystems” the United Nations Foundation (UNF), in consultation with several UN organs (including United Nations Development Program (UNEP), United Nations Environment Program (UNEP), Food and Agricultural Organization (FAO), Secretariat of the Convention on Biological Diversity (CBD) and the Global Environment Facility (GEF)), adopted a Biodiversity Programme Framework, targeting financial support for “World Heritage Biodiversity Sites”.

General Workshop Overview (objectives, outputs, background paper):

The upcoming workshop; “World Heritage Biodiversity: Filling Critical Gaps and Promoting Multi-Site Approaches to New Nominations of Tropical Coastal, Marine and Small Island Ecosystems”, funded by UNF, and carried out by UNESCO and the US National Oceanic and Atmospheric Administration, aims to remedy the gaps in World

Heritage coverage of these ecosystem types by gathering internationally and regionally recognized experts to form a scientifically-based consensus list of potential “tropical coastal, marine and small island ecosystems” sites. This is seen as the first step in the process of expanding coverage of tropical marine WH sites in order to maximize conservation of globally significant areas of marine biodiversity.

The Biodiversity Programme Framework recognizes that an important component of marine biodiversity preservation is the protection of cluster and transborder sites. Multi-site nominations are particularly important for tropical coastal, marine and small island ecosystems because of the high numbers of migratory species in these systems, and because of the interconnected nature of marine systems. A second goal of the workshop is to examine the list of potential sites to identify potential opportunities for multi-site nominations.

A report will be developed from the results of the workshop and submitted to the World Heritage Committee. The report will include a science-based consensus list of potential sites for further consideration as “tropical coastal, marine and small island ecosystem” Natural World Heritage properties. The potential sites will be of regional and global significance in terms of their biodiversity values. The sites themselves need not be defined in terms of exact boundaries, as it will be up to the individual state parties to move forward with the delineation of sites, and the nomination process.

For the purposes of the workshop, biodiversity or biological diversity is defined as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”, as stated in the Convention on Biological Diversity. Important components of marine biodiversity that will be addressed in the workshop's potential site selection process will include biological productivity and ecosystem processes as well as considering species to ecosystem diversity. Socio-economic concerns and sustainable use are not a focus of the workshop per se, though these aspects of biodiversity preservation will certainly come up in discussions of feasibility and constraints to World Heritage nomination.

A biogeographic approach to potential site selection will be taken at the September workshop, based in part on the participatory frameworks developed by organizations such as CI, TNC, and WWF for identifying conservation priorities, which use expert knowledge as the primary tool. In these expert workshops site selection takes place within regional units, whose boundaries are based on patterns of global biodiversity. In order to ensure representation of biodiversity at a global scale, it is proposed to take a similar approach in the selection of potential “tropical coastal, marine and small island ecosystem” World Heritage sites by examining the importance of tropical marine biodiversity at both the regional and global levels. The application of our approach will result in the selection of a representative set of priority areas, and sites (within these areas), with an emphasis placed on large-scale interconnections within areas (i.e. a site consisting of cluster of small islands would be more appropriate than a site consisting of an isolated beach).

The goal of this paper is to provide participants with information on the technical aspects of the upcoming WH workshop. This document contains details of the workshop goals, potential site selection criteria, selection framework, and supporting material, together with detailed appendices describing biodiversity selection approaches used by other conservation organizations.

Workshop Goals and Process:

The September 2001 workshop is the first step in an effort to build international scientific support for expanding the existing network of World Heritage sites recognized primarily for their “tropical coastal, marine and small island ecosystem” values. The specific goals of the workshop are to:

- 1) Conduct a global review of “tropical coastal, marine and small island” biodiversity representativeness and examine gaps in World Heritage coverage of these ecosystems.
- 2) Develop an expert-based list of potential “tropical coastal marine and small island ecosystem” World Heritage sites that would qualify for nomination to the World Heritage List of Natural Properties (not all the sites we choose will be nominated, and there will be other sites nominated by State Parties that will not arise at the workshop)
- 3) Within this potential list, identify potential areas for multi-site (cluster and transborder) nomination.
- 4) Identify constraints to nomination of potential sites, including constraints to multi-site; cluster and transborder, nominations.
- 5) Develop innovative strategies for multi-site nominations, and transborder nominations.
- 6) Identify critical knowledge gaps and policy needs for further consideration by the World Heritage Committee.

Pre-Workshop Activities:

- 1) Commission and circulation of regional reports:

Regional papers have been commissioned to support site selection at the workshop, and will represent a starting point for regional discussions. The regions are: (1) Latin America and the Caribbean, (2) East Africa, (3) West Africa, (4) Pacific, (5) South East Asia, and the (6) Red Sea, Gulf of Aden and the Arabian Sea. The regional papers discuss the biodiversity values and threats to each region as a whole, then put forth potential candidate sites for consideration by the workshop expert participants.

- 2) Collation of relevant datasets and analyses:

In order to support informed and systematic site selection at the workshop, at both regional and global scales, a comprehensive group of datasets describing the distributions of species and habitats, as well as the distributions of physical oceanographic processes will be used. These datasets, which are being compiled and analyzed by WCMC and

WWF-US are listed and described in Appendix 2. These datasets will be available as map overlays for use in the regional discussions and larger plenary sessions.

2) Agreement on a selection framework and criteria:

A pre-conference meeting of marine experts from the Washington DC area was held this spring at the NOAA headquarters in Silver Spring, Maryland (USA) to develop appropriate selection criteria for the September World Heritage workshop. During that meeting a list of criteria was developed that reflected criteria currently used by conservation NGOs and conservation institutions in the selection of sites for marine biodiversity conservation. See Appendix 3 for details.

3) Circulation of a workshop orientation paper (this paper)

The framework and criteria for the workshop were presented to experts for review as an orientation document. Experts received copies of the regional papers commissioned to support the workshop. This material was intended to acquaint participants with the goals and methodology that will be used at the workshop, and provide some background material on the regions. During this consultative process we received comments which have been incorporated into the final framework.

Workshop Activities:

The workshop will consist of a series of presentations, working sessions and plenary discussions, designed to address the general workshop goals outlined above. The core of the workshop will be the working group sessions. The plenary sessions will be used to present the results and obtain comments. The working groups will be asked to perform three main tasks, which are outlined below. The supporting material, selection criteria, workshop ground-rules and guiding principles are described in the next section. A detailed workshop process document is also included as an appendix.

1) After an introductory plenary session the participants will break out into regional working groups. First, each group will discuss the biogeography of their region, including important biodiversity features and begin to identify priority areas within their region based on the proposed site selection criteria, from which they will later select potential World Heritage sites. These discussions will use the potential sites described in the commissioned regional papers as their starting point. In concert with this discussion of regional priority areas, groups will review the selection criteria, and discuss any changes (including additions, or deletions), based on how the proposed criteria fit the areas representative of biodiversity. Following, consensus will be developed on a consistent set of selection criteria to be applied to the site selection process for all regions. The regional groups will then begin to develop ranked potential site lists based on the priority areas delineated and the consensus list of selection criteria. The groups will examine their lists for potential cluster and transborder sites, and will discuss the overall “tropical coastal marine, and small island ecosystems” representativeness of the list. These sites will be further evaluated for threats, constraints to their nomination, and will be evaluated against the existing World Heritage Criteria and Conditions of Integrity for natural properties. The threats and constraints analysis will not be used to exclude

sites from the potential list, as the workshop places emphasis on biodiversity value. However, these considerations will play an important role in nomination process, which does exclude the listing of highly threatened sites. After these discussions, the group will prepare the final list for presentation to the plenary, which will consist of the regions top ten ranked sites.

2) In the plenary session, the regional working groups will present their potential site lists. The full plenary will then develop a consensus potential global list of “Tropical Coastal, Marine and Small Island Ecosystem” sites, and identify opportunities for cluster and transborder nominations. The plenary will also discuss the nomination process, including constraints to listing, and innovative strategies for nomination, building on the information gathered in the regional groups. Further policy and research needs will then be identified.

Ground Rules for Workshop, Guiding Principles, Framework for site Selection and Selection Criteria:

To ensure that the workshop is as effective as possible in the time available, a set of ground rules have been developed. The goal of these ground rules is to help keep both participants and organizers focused on their respective tasks and to clarify the process that will be followed.

Ground rules are as follows:

- 1) During the workshop, expert participants will not debate the merits of the approach to site selection.
- 2) The final Framework serves as the guidance document for workshop discussions and site selection.
- 3) Once consensus is reached on the biodiversity and evaluation criteria, and how to apply them, the regional groups will apply them to the site selection process in a uniform approach.

Guiding principles and site selection criteria are described here. Their purpose is to frame the workshop discussion through visionary statements; they are intended to guide the overall identification and selection of potential sites. The final list of sites will embody the principles as a whole; the individual sites need not fulfill all of the principles and meet all of the related selection criteria.

The principles described below supplement the existing World Heritage Criteria and Conditions of Integrity for Natural Sites (Appendix 4). These existing guidelines address outstanding universal value and integrity but do not address the issue of global or regional representativeness in the protection of ecosystems or species, nor do they invoke the precautionary principle. The principles outlined here represent a more comprehensive view of biodiversity than is stated in the text of World Heritage Convention, though they do not overstep the boundaries of the Convention. They draw heavily on the Guiding Principles identified by ANZECC – the Australian and New Zealand Environment and

Conservation Council (ANZECC 1998) and the Representative Areas Program of the Great Barrier Reef World Heritage Area (Day et al. 2001):

Guiding Principles:

- 1) Universal Value (Includes Uniqueness)– to ensure the preservation of “Universal Value”, the site should be of universal value in terms of it’s biodiversity, natural landscapes, geological and oceanographic features on regional and global levels
- 2) Representativeness – to ensure the preservation of “Representativeness” the list of potential sites should maximize representation of biodiversity, natural landscapes, and geological and oceanographic features at both global and regional levels of significance.
- 3) Ecological Integrity: To ensure the preservation of “Ecological Integrity” the full range of ecological processes, habitats and taxa and their interconnections within and across tropical marine regions should be included. These areas should contain habitats for maintaining the most diverse fauna and flora characteristic of the biogeographic province and ecosystems under consideration.
- 4) Protection against future Environmental Change – to ensure the preservation of the above three principles in the face of future environmental change both natural and anthropogenically induced.

It is important to stress that because there are cross-linkages between the individual Guiding Principles, they are to be viewed as a whole. They serve as a broad platform, on which the selection criteria are based. The selection criteria draw on a review of global, regional, and national examples of priority setting criteria used for marine and coastal ecosystems and expert consultation, as explained in the above section. The selection criteria are specific, and are meant to guide the site selection process.

The selection criteria are as follows.

Site Selection Criteria:

- Sites important for the maintenance of essential ecological processes or life-support systems, including sites of important geological, ecological, and oceanographic processes and features (high primary and secondary production, important upwellings, eddies etc.)
- Sites of uniqueness, containing important habitat, including habitat for rare, vulnerable or endangered species
- Sites of high endemism
- Sites of high species richness
- Sites representative of regionally and/or biogeographically important species assemblages or community types
- Sites important for shared populations, including areas significant as migrating, congregating, breeding, and/or feeding grounds, sites important for replenishment and

maintenance, sites that contain key habitat for the various life history phases of these species.

- Sites significantly large, in a state of naturalness, containing a variety of intact habitats and species assemblages (e.g. wetlands, islands, coastal zones such as watersheds, estuaries and reef systems) to maintain the integrity and sustainability of marine ecosystems and species populations.

The above list of criteria reflects commentary submitted by workshop participants prior to the workshop. At the workshop, participants will test the applicability of these criteria to selected representative, priority areas for biodiversity within their region. At this time they will be able to suggest additional criteria. After the regional groups have discussed the criteria, appointed representatives from each group will meet to finalize the set of selection criteria for the workshop. The regional groups will apply a uniform and universal set of selection criteria, in order to ensure a balanced final list of potential sites is put forth to the World Heritage Committee.

Threat and Vulnerability Assessment/Feasibility Assessment:

After the regional groups select priority areas, and sites based on the selection criteria above, the individual sites will be evaluated in terms of their vulnerability and the threats and facing them, both anthropogenic and natural. It will be up to the regional experts, first on an individual, then group basis, to decide what threats are most significant within each region, and rank them accordingly. This discussion will also address the feasibility of nomination, to the extent that workshop participants are familiar with the constraints applicable to each site. These constraints can include socio-economics, potential donor support, current management, and sustainability.

The threats and vulnerability discussion can be limited to the highest priority regional sites. Threat categories have been adapted from the WWF-US priority setting workshop process and are as follows:

Threat and Vulnerability Categories:

- Threats from coastal development (including tourism)
- Threats from land-based activities (including agriculture, mining, forestry practices etc)
- Threats from marine pollution
- Water Quality threats
- Consumptive resource use threats
- Threats from climate change

Following, or in concert with the threats analysis, it will be important to assess the constraints to site nominations. This is important to understand in order to determine if

current threats to sites can be ameliorated. To facilitate this assessment, the participants will discuss and record the following information about each site, to their best knowledge. This, as with the threats analysis can be limited to the priority regional sites. This information includes:

Feasibility/Constraints for Listing:

- Whether or not the site is located within a state party
- How the site is protected
- Management system
- Socio-economic issues
- Potential involvement of the donor community, NGO's, the scientific community and other important stakeholders
- Long-term monitoring and Assessment

The results of threats and vulnerability analysis, and the stakeholder analysis will not change the priority of a potential site at this stage, but they will be an important factor in the nomination process of a site. The results of these analyses will inform the recommendations made to the World Heritage Committee in the final Workshop Report.

The proposed regional site selection process is outlined step by step in Appendix 1 (to be attached later).

Consensus List of Potential Sites Recommended to the World Heritage Committee:

Based on the sites proposed by the regional breakout groups the full plenary will come to consensus on the potential site list and opportunities for cluster and transborder nomination to recommend to the World Heritage Committee. Emphasis will be placed on universal value, ecological integrity, and global representativeness of marine biodiversity, ensuring coverage of all “tropical coastal, marine and small island ecosystems”. The threats to the individual sites will also factor into the selection of the global potential list.

During the consensus building process, the full plenary will discuss constraints to the nomination of the sites being proposed, and constraints of the World Heritage Listing process in general. How the potential sites meet or do not meet the World Heritage Criteria for Natural Properties, and the Conditions of Integrity for Natural Properties will be discussed. The conclusions drawn from the full plenary, as well as those of the regional groups, will form the basis of the Report to the World Heritage Committee.

Appendix 2: Compilation of Biogeographic Datasets by World Wildlife Fund – US and World Conservation Monitoring Center

	Media/Format	Reference
Bathymetry	Digital 1km grid	UCSD Topex/Estimated Bath.
Continental shelf	Digital 1km grid	UCSD Topex/Estimated Bath.
SST anomalies	Digital 9km grid	Maggie Toscano, NOAA, NESDIS
SST frequencies	Digital 9km grid	Maggie Toscano, NOAA, NESDIS
SST – seasonal	5yr monthly digital gridded	Global-Arc
Reefs at Risk	Digital 4km grid	WRI
World Ports	Digital points	World Port Index, USGS
LMEs	Digital polygons	Sherman, et al.
Baileys ecoregions	Digital image	Ecoregions, Bailey
MPAs	Digital poly/point	WCMC
Terrestrial protected areas	Digital poly/point	WCMC
World Heritage Sites	Digital point	UNESCO
WWF Marine Global 200	Digital polygons	WWF-US
C.R.'s / CI marine endemism	Digital	Callum Roberts / Conservation International
C.R.'s / CI coral	Digital	Callum Roberts / Conservation International
C.R.'s / CI mollusk	Digital	Callum Roberts / Conservation International
C.R.'s / CI lobster	Digital	Callum Roberts / Conservation International
Sea grass diversity	Digital	WCMC
Mangrove diversity	Digital	WCMC
Sea grass location	Digital polygons	WCMC
WCMC coral location	Digital polygons / lines	WCMC
WCMC mangrove location	Digital polygons	WCMC
Phytoplankton productivity	Digital gridded	Global-Arc
Zooplankton distribution	Digital gridded	Global-Arc
Tuna distribution and spawning	Digital gridded	Global-Arc
		Gregg and Conkright, 2000. (http://www.nodc.noaa.gov/OC5/pr_chlr.html).
Ocean color (seasonal)	Digital satellite	Müller et al. 1997
Sea floor age	Digital gridded	World Ocean Atlas
Surface salinity	Digital gridded	WWF
Kelleher's regions	Digital polygons	
<u>Difficult to acquire:</u>		
EEZ boundaries	Digital polygons	MRJ Technology
Global surface circulation	Paper	????
Sea floor features	Paper	????

Appendix 3: Marine Biodiversity Priority Setting Approaches Reviewed and incorporated into the Workshop Process for Potential Site Selection

GLOBAL APPROACHES	
CI – Hotspots (terrestrial systems - global)	<ul style="list-style-type: none"> • species endemism • degree of threat
CI – Global Assessment (marine systems) <i>used to assess the world's 74 LMEs (large marine ecosystems)</i>	<p>Tier 1:</p> <ul style="list-style-type: none"> • species richness and endemism in selected taxa (seagrasses, corals, mollusks, shrimps, lobsters, sharks, seabirds, cetaceans, sirenians, and pinnipeds and meiofaunal species) <p>Tier 2:</p> <ul style="list-style-type: none"> • areas where key ecological processes are concentrated (areas of high primary and secondary production, large estuarine areas, and important corridors for marine migration, oceanographic mixing areas such as upwelling and convergence zones). <p>Tier 3:</p> <ul style="list-style-type: none"> • direct and indirect threats to important marine areas (coastal habitat conversion for development, destructive fishing, deforestation in coastal zone, aquaculture related habitat loss, eutrophication, toxic loading, freshwater diversions, climate change impact, direct threat to endangered species, mining and dredging, civil engineering works, large scale social conflict, ocean dumping, shipping, alien species invasion, over-exploitation, fisheries bycatch, and special threats affecting small islands). Threats were then ranked by (1) reversibility, (2) magnitude of impact, (3) geographical scale of impact, (4) duration of impact/ecological change, (5) negative synergy with other threats.
Kelleher Approach	<p>Biogeographic Criteria:</p> <ul style="list-style-type: none"> • Presence of rare biogeographic qualities or representative of a biogeographic “type” or types • Existence of unique or unusual geological features <p>Ecological Criteria</p> <ul style="list-style-type: none"> • Ecological processes or life support systems • Integrity - degree to which the area either by itself or in association with other protected areas, encompasses a complete ecosystem • The variety of habitats • Presence or absence of rare or endangered species • Presence of nursery or juvenile areas • Presence of feeding, breeding and rest areas • Existence of rare or unique habitat for any species <p>Naturalness</p> <ul style="list-style-type: none"> • The extent to which the areas has been protected from, or has not been subject to human-induced change <p>Economic Importance</p> <p>Social importance</p> <p>Scientific importance</p>

	<p>International or national significance Practicality/feasibility</p> <p>Also consider;</p> <ul style="list-style-type: none"> • Site difference in recruitment (sinks and sources) • Key breeding and migration areas (ex. Marine mammals, birds and reptiles have a total range but small breeding range or critical breeding sites) • Isolated areas and endemism (ref. Oceanic isolated islands and shoals) • Areas of high productivity (areas of high productivity in ocean may not be biologically diverse, but are important to maintenance of biodiversity) support upwelling containing large amounts of nutrients and high biomass production) • Vulnerable Species • Extinction • Taxonomic Diversity • Genetic diversity
<p>WWF Global 200: A Representation Approach to Conserving the Earth's Distinctive Ecoregions</p>	<p>Identifies 233 ecoregions as outstanding examples of the world's diverse ecosystems and priority targets for conservation action. Ecoregion selection based on analysis of:</p> <ul style="list-style-type: none"> • Species richness • Species endemism • Unique taxa (e.g. unique genera or families, relict species or communities, primitive lineages) • Unusual ecological or evolutionary phenomena • Global rarity of major habitat types <p>Selected outstanding ecoregions (terrestrial, freshwater, and marine) within each major habitat type from each of the world's biogeographic realms and ocean basins to capture variation in species assemblages around the world.</p>
<p>Thorsell A Global Overview of Wetland and Marine Protected Areas on the World Heritage List (1997)</p>	<p>Focuses on wetlands and marine sites (e.g. coral reefs, open ocean, island)</p> <p>For wetland and marine values:</p> <ul style="list-style-type: none"> • based on whether or not the marine values were one of the most important characteristics of the site and whether or not it was part of the criteria mentioned by the State Party in the nomination for World Heritage designation. Uses RAMSAR criteria to determine list of sites with significant wetland and marine values
<p>(from Global Marine Biological Diversity: A strategy for Building Conservation into Decision Making. 1993. ed. Elliott Norse. Island Press)</p>	<ul style="list-style-type: none"> • species of special concern (marine mammals, sea turtles, endangered and threatened species) important areas (areas of high diversity, areas of high endemism, areas of high productivity, spawning areas that serve as sources for recruits, nursery, grounds, migration stopover points and bottlenecks).
REGIONAL APPROACHES	

<p>TNC</p> <p>Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean</p>	<p>Identifies and Ranks Coastal Systems in Central Caribbean Ecoregion by:</p> <ul style="list-style-type: none"> • Delineates coastal biogeographic provinces (looked at biological, physical and geographic characteristics (including features of the continental shelf and ocean currents, water temperature regime and occurrence of upwellings) • Delineates coastal biogeographic regions (marine ecoregions) (defined and delineated according to patterns of ocean circulation, coastal geomorphology and distribution of major faunal population) • Ranks ecoregion within provinces (based on biological value and conservation status). Established indicators (direct and indirect measures of biological value and conservation status). Reviewed based (measures of biodiversity, resource abundance, or changes in natural systems). Geographic priorities set low, medium, with assigned numerical values <ul style="list-style-type: none"> - Indicators of biological value: <ul style="list-style-type: none"> Physical condition Species Composition Presence and Abundance of Species Breeding Endemism Fisheries resources - Evaluation and ranking of conservation status <ul style="list-style-type: none"> Alteration of Habitats Loss of Species Loss of Breeding and Nursery Sites Changes in Abundance Potential Threats <p>Workshop reviewed province, ecoregion and coastal system delineation and rank ecoregions. Experts divided into provinces in which their area of expertise fell. After reaching consensus on province and ecoregion boundaries and assessing quality and extent of data, the groups agreed on which criteria to use for ranking ecoregions within their province. After agreement on criteria, each ecoregion was ranked relative to the other ecoregions in the same province (low, medium and high with and assigned numerical value (1,2,3 respectively). Each table of indicators totaled. Score card showed ranking for each province.</p> <p>Priority sites determined by:</p> <ul style="list-style-type: none"> • Selecting the best representative of each type of coastal setting or environment. (unique features and threats, human impacts assessment and feasibility assessment) • Selecting the widest geographic distribution of coastal systems • Selecting sites based on feasibility and urgency of their conservation status • (unique features and threats, human impacts assessment and feasibility assessment)
<p>NATIONAL APPROACHES</p>	
<p>The Representative Areas</p>	<p>General Principles (CAR Principles, developed by the Australian and New Zealand Environmental Conservation Council –</p>

<p>Program (RAP)– Jon Day et al. (applied to the Great Barrier Reef World Heritage Area – GBRWHA)</p>	<p><u>ANZECC – 1988) to guide the development of a national system of MPAs:</u></p> <ul style="list-style-type: none"> • Comprehensive – including the full range of diversity across the marine environment as recognized at an appropriate scale (i.e. ecosystem, habitat, community, population, species and genetic diversity). Special or unique biological communities, habitats or species comprise one part of the full range of diversity) • Adequacy – refers to the size, configuration, replication, and level of protection offered with an HPA network to ensure the maintenance of ecological viability, to allow sufficient levels of connectivity between populations, species and habitats, and to safeguard the integrity of natural processes. • Representative – an area is typical of its surroundings at some chosen spatial scale (i.e. at the scale of habitat, community or population). A representative area within a particular region therefore has similar physical features, oceanographic processes and ecological patterns to elsewhere in that region, and is likely to have similar biological communities and/or species to other areas when mapped at that scale. <p><u>Biophysical principles:</u></p> <ul style="list-style-type: none"> • Have highly protected areas (HPAs) whose minimum size is 20km along its smallest dimension (recognizing this is not always possible in some locations, for example, when representing long coastal bioregions). • Have larger (versus smaller) HPAs. • Have sufficient replication • Include only whole reefs within HPAs. • Per reef bioregion, have at least 5 reefs and x% of reef area included. • Per non-reef bioregion, have at least x% of non-reef area included • Include x% or x number of each community type and physical environment type in the overall network (e.g. diversity of depths, reef sizes, submerged reefs). • Maximize the use of environmental information to determine the best configuration of HPAs. • Include biophysically special/unique places (e.g. significant spawning areas, nursery sites) • Consider sea and adjacent land uses in determining HPAs. • Capture GBR regional diversity across the continental shelf and latitudinally.
<p>WWF – Canada (from Planning for Representative Marine Protected Areas: A Framework for Canada’s Oceans. 2000)</p>	<p><u>Principles used to classify seascapes:</u></p> <ul style="list-style-type: none"> • An approach based on marine enduring features should be used to classify marine habitat types • Data describing marine enduring features used to delineate seascapes should be available, either directly or via suitable surrogates at comparable scales, for all areas • A community level analysis of biological diversity should be done for all areas • The marine enduring features should include a range of fundamental physiographic and oceanographic factors • Classification should be hierarchical so that description occurs on different spatial scales • The classification system should have a global perspective in which the higher levels of classification are defined by global processes. • The higher levels of the classification hierarchy should discriminate broadly between community types, while lower levels should discriminate more closely • The classification system should have predictive power

	<ul style="list-style-type: none"> • The classification system should be logical, easy to use and stable (or naturally adaptable) • The classification system should clearly delineate repeating community or habitat types based on scalable and non scalable marine enduring features • It will be necessary to consider the pelagic and benthic communities separately • MPA selection will require separate analysis of more ecological info, and will require socio-economic evaluation of alternatives. MPAs may be contained with several seascapes.
INTERNATIONAL AGREEMENTS	
World Heritage Convention	<p>Natural Heritage Criteria:</p> <ol style="list-style-type: none"> 1. Be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features; 2. Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal and marine ecosystems and communities of plants and animals; 3. Containing superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; or 4. Containing the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.
RAMSAR	<p>Group A of the Criteria. Sites containing representative, rare or unique wetland types</p> <ul style="list-style-type: none"> • Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region. <p>Group B of the Criteria. Sites of international importance for conserving biological diversity</p> <p>Criteria based on species and ecological communities</p> <ul style="list-style-type: none"> • Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities. • Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region. • Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions. • Specific criteria based on waterbirds • Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds. • Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. • Specific criteria based on fish • Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity. • Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes
Specialty Protected Areas and	Under Article 4 : Establishment of Protected Areas

Wildlife in the Wider Caribbean Region (SPAW)	<p>Such areas shall be established in order to conserve, maintain and restore, in particular:</p> <ol style="list-style-type: none"> representative types of coastal and marine ecosystems of adequate size to ensure their long-term viability and to maintain biological and genetic diversity; habitats and their associated ecosystems critical to the survival and recovery of endangered, threatened or endemic species of flora or fauna; the productivity of ecosystems and natural resources that provide economic or social benefits and upon which the welfare of local inhabitants is dependent; and areas of special biological, ecological, educational, scientific, historic, cultural, recreational, archaeological, aesthetic, or economic value, including in particular, areas whose ecological and biological processes are essential to the functioning of the Wider Caribbean ecosystems.
Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA Protocol)	<p>Protocol: Article 8, Paragraph 2: "List of Specially Protected Areas of Mediterranean Importance", hereinafter referred to as the "SPAMI List" may include sites which:</p> <ul style="list-style-type: none"> are of importance for conserving the components of biological diversity in the Mediterranean; contain ecosystems specific to the Mediterranean area or the habitats of endangered species; are of special interest at the scientific, aesthetic, cultural or educational levels. <p>ANNEX I: COMMON CRITERIA FOR THE CHOICE OF PROTECTED MARINE AND COASTAL AREAS THAT COULD BE INCLUDED IN THE SPAMI LIST</p> <p>A. GENERAL PRINCIPLES</p> <ol style="list-style-type: none"> The conservation of the natural heritage is the basic aim that must characterize a SPAMI. No limit is imposed on the total number of areas included in the List or on the number of areas any individual Party can propose for inscription. The listed SPAMI and their geographical distribution will have to be representative of the Mediterranean region and its biodiversity. The SPAMIs will have to constitute the core of a network aiming at the effective conservation of the Mediterranean heritage... notably through the establishment of transboundary SPAMIs. Parties ensure that sites included in the List are provided with adequate legal status, protection measures and management methods and means. <p>B. GENERAL FEATURES OF THE AREAS THAT COULD BE INCLUDED IN THE SPAMI LIST</p> <ol style="list-style-type: none"> To be eligible for inclusion in the SPAMI List, an area must fulfill at least one of the general criteria set in Article 8 paragraph 2 of the Protocol. The regional value is a basic requirement of an area for being included in the SPAMI List. The following criteria should be used in evaluating the Mediterranean interest of an area: <ol style="list-style-type: none"> Uniqueness (unique or rare ecosystems, or rare or endemic species) Natural representativeness (Representativeness is the degree to which an area represents a habitat type, ecological process, biological community, physiographic feature or other natural characteristic.) Diversity (species, communities, habitats or ecosystems) Naturalness (lack or low level of human-induced disturbance and degradation)

	<ul style="list-style-type: none"> e) Presence of habitats that are critical to endangered, threatened or endemic species. f) Cultural representativeness (environmentally sound traditional activities integrated with nature which support the well-being of local populations). <ol style="list-style-type: none"> 3. To be included in the SPAMI List, an area having scientific, educational or aesthetic interest must, respectively, present a particular value for research in the field of natural sciences or for activities of environmental education or awareness or contain outstanding natural features, landscapes or seascapes. 4. Besides the fundamental criteria specified in article 8, paragraph 2, of the Protocol, a certain number of other characteristics and factors should be considered as favorable for the inclusion of the site in the List. These include: <ul style="list-style-type: none"> a) the existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area; b) the involvement and active participation of the public in general, and particularly of local communities, in the process of planning and management of the area; c) the existence of a body representing the public, professional, non-governmental sectors and the scientific community involved in the area; d) the existence in the area of opportunities for sustainable development; e) the existence of an integrated coastal management plan within the meaning of Article 4 paragraph 3 (e) of the Convention.
Convention on Biological Diversity	<p>There is no specific guidance from the Convention with regard to criteria of selection of marine protected areas, except the provision of critical habitats for marine living resources as important criterion for selection of marine and coastal protected areas, within the framework of integrated marine and coastal area management as mentioned in paragraph (iv), Annex I to decision II/10. Moreover, decision IV/5 reiterated that critical habitats for marine living resources should be one important criterion for selection of the marine and coastal protected areas (operational objective 3.2, activity (b) of the Jakarta Mandate Programme of Work).</p> <p>ANNEX I (an indicative list of categories on which in accordance to Article 7(a) of CBD(on identification and monitoring), Contracting Party shall, in particular for the purposes of Articles 8 to 10, identify components of biological diversity important for its conservation and sustainable use)</p> <p>IDENTIFICATION AND MONITORING</p> <ol style="list-style-type: none"> 1. Ecosystems and habitats: containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or, which are representative, unique or associated with key evolutionary or other biological processes; 2. Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and 3. Described genomes and genes of social, scientific or economic importance.
International Maritime Organization (IMO)	<p>From resolution A.720 (17) of IMO: To be identified as a Particularly Sensitive Sea Area (PSSA), the area should meet at least one of the Following criteria:</p> <ol style="list-style-type: none"> 1. Ecological criteria: uniqueness or rarity, critical habitat, dependency, representativeness, diversity, productivity, spawning or

	breeding grounds, naturalness, integrity and vulnerability; 2. Social, cultural and economic criteria: economic benefit, recreation and human dependency; 3. Scientific and educational criteria: research, baseline and monitoring studies, education and historical value.
The Baltic Convention	The Baltic Convention 43. Under the Baltic Convention, a coastal or marine area of the Baltic Sea Region can be designated as Baltic Sea Protected Areas (BSPA) if it meets the criteria set out in the Guidelines for designated BSPA under HELCOM (Helsinki Commission) Recommendation 15/5, also taking into consideration the interests of fisheries and aquaculture. The following are criteria for the areas selected for protection: <ol style="list-style-type: none"> 1. Areas with high biodiversity; 2. Habitats of endemic, rare or threatened species and communities of fauna and flora; 3. Habitats of migratory species; 4. Nursery and spawning areas; and 5. Rare or unique or representative geological or geomorphological structure process.
Migratory Species of Wild Animals	a) identify the migratory species covered; b) describe the range and migration route of the migratory species; c) provide for each Party to designate species and to develop habitat protection plans

Appendix 4:

World Heritage Convention text: Natural Heritage Criteria and Conditions of Integrity

43. In accordance with **Article 2** (provided below) of the Convention, the following is considered as "natural heritage":

"natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;

geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;

natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty."

44. A natural heritage property - as defined above - which is submitted for inclusion in the World Heritage List will be considered to be of outstanding universal value for the purposes of the Convention when the Committee finds that it meets one or more of the following criteria and fulfils the conditions of integrity set out below. Sites nominated should therefore:

a.

i. be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features; or

ii. be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals; or

iii. contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; or

iv. contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation;

and

b. also fulfill the following conditions of integrity:

- i. The sites described in 44(a)(i) should contain all or most of the key interrelated and interdependent elements in their natural relationships; for example, an "ice age" area should include the snow field, the glacier itself and samples of cutting patterns, deposition and colonization (e.g. striations, moraines, pioneer stages of plant succession, etc.); in the case of volcanoes, the magmatic series should be complete and all or most of the varieties of effusive rocks and types of eruptions be represented.
- ii. The sites described in 44(a)(ii) should have sufficient size and contain the necessary elements to demonstrate the key aspects of processes that are essential for the long-term conservation of the ecosystems and the biological diversity they contain; for example, an area of tropical rain forest should include a certain amount of variation in elevation above sea-level, changes in topography and soil types, patch systems and naturally regenerating patches; similarly a coral reef should include, for example, seagrass, mangrove or other adjacent ecosystems that regulate nutrient and sediment inputs into the reef.
- iii. The sites described in 44(a)(iii) should be of outstanding aesthetic value and include areas that are essential for maintaining the beauty of the site; for example, a site whose scenic values depend on a waterfall, should include adjacent catchment and downstream areas that are integrally linked to the maintenance of the aesthetic qualities of the site.
- iv. The sites described in paragraph 44(a)(iv) should contain habitats for maintaining the most diverse fauna and flora characteristic of the biographic province and ecosystems under consideration; for example, a tropical savannah should include a complete assemblage of co-evolved herbivores and plants; an island ecosystem should include habitats for maintaining endemic biota; a site containing wide-ranging species should be large enough to include the most critical habitats essential to ensure the survival of viable populations of those species; for an area containing migratory species, seasonal breeding and nesting sites, and migratory routes, wherever they are located, should be adequately protected; international conventions, e.g. the Convention of Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), for ensuring the protection of habitats of migratory species of waterfowl, and other multi- and bilateral agreements could provide this assurance.
- v. The sites described in paragraph 44(a) should have a management plan. When a site does not have a management plan at the time when it is nominated for the consideration of the World Heritage Committee, the State Party concerned should indicate when such a plan will become available and how it proposes to mobilize the resources required for the preparation and implementation of the plan. The State Party should also

provide other document(s) (e.g. operational plans) which will guide the management of the site until such time when a management plan is finalized.

vi. A site described in paragraph 44(a) should have adequate long-term legislative, regulatory, institutional or traditional protection. The boundaries of that site should reflect the spatial requirements of habitats, species, processes or phenomena that provide the basis for its nomination for inscription on the World Heritage List. The boundaries should include sufficient areas immediately adjacent to the area of outstanding universal value in order to protect the site's heritage values from direct effects of human encroachment and impacts of resource use outside of the nominated area. The boundaries of the nominated site may coincide with one or more existing or proposed protected areas, such as national parks or biosphere reserves. While an existing or proposed protected area may contain several management zones, only some of those zones may satisfy criteria described in paragraph 44(a); other zones, although they may not meet the criteria set out in paragraph 44(a), may be essential for the management to ensure the integrity of the nominated site; for example, in the case of a biosphere reserve, only the core zone may meet the criteria and the conditions of integrity, although other zones, i.e. buffer and transitional zones, would be important for the conservation of the biosphere reserve in its totality.

vii. Sites described in paragraph 44(a) should be the most important sites for the conservation of biological diversity. Biological diversity, according to the new global Convention on Biological Diversity, means the variability among living organisms in terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species and of ecosystems. Only those sites which are the most biologically diverse are likely to meet criterion (iv) of paragraph 44(a).

45. In principle, a site could be inscribed on the World Heritage List as long as it satisfies one of the four criteria and the relevant conditions of integrity. However, most inscribed sites have met two or more criteria. Nomination dossiers, IUCN evaluations and the final recommendations of the Committee on each inscribed site are available for consultation by States Parties which may wish to use such information as guides for identifying and elaborating nomination of sites within their own territories.

Article 2

For the purposes of this Convention, the following shall be considered as "natural heritage":

natural features consisting of physical and biological formations or groups

of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;

geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;

natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.